Bacterial Quality of Kafrelsheikh Students House Meals

Mostafa, N.Y. and Ghada, A.K.
Fac. Vet. Med., Kafrelsheikh University

Abstract

A total of 60 random samples of raw and cooked meat samples (30 of each) were collected from students house of Kafrelsheikh University. The samples were examined for total aerobic bacterial count, *Staphylococcus aureus* count, coliforms count and for detection of Salmonella. Obtained results were $2.43 \times 10^6 \pm 6.95 \times 10^5$, $4.8 \times 10^4 \pm 8.63 \times 10^3$, $2.55 \times 10^5 \pm 1.14 \times 10^5$, and 0, respectively in raw meat samples while that of cooked meat samples were $9.40 \times 10^5 \pm 4.32 \times 10^5$, $2.45 \times 10^4 \pm 1.16 \times 10^4$, $28 \times 10^3 \pm 2.23 \times 10^3$ and 0, respectively. The lower counts and percents were of cooked meat samples. The obtained results and the public health significance for these microorganisms were discussed.

Introduction

Meat is the flesh of animal used as food due to its high nutritive value It considered as an essential food for most human being due to high levels of protein, vitamins and some minerals. Red meat may act as a vehicle for some food poisoning microorganisms, such as *Salmonella* and *Staphylococcus aureus* which may constitute a public health hazard for consumers (3).

Cooked meat meals are often involved in food poisoning cases. These foods are prepared by hand and this direct contact may lead to an increased incidence of food poisoning agents such as *Staphylococcus aureus* (6).

Personal hygiene, including frequent washing of hands and application of sanitary programs has a great importance for reducing post cooking contamination of meals (3).

Materials and Methods

A total of 60 random samples of raw and cooked red meat (30 of each) were collected from the student house of Kafrelsheikh University all over a year. The samples were collected under hygienic conditions and transferred in an ice box to the laboratory with minimum time of delay.

As 10 gm of each samples were aseptically transferred to a sterile flask contained 90 ml of sterile peptone water (0.1%) homogenized for 2 min. to provide homogenate of 10^{-1} dilution. From it tenth fold serial dilution were prepared up to 10^{-6} (APHA, 1992).

The total aerobic bacterial count per gram sample was calculated according to APHA (1). *Staphylococcus aureus* count according to Smith and Baird Parker (9). Coliforms count according to ICMSF (5). Isolation of Salmonella according to Varnam and Evans (11).

Results

Table (1): Statistical analytic results of total aerobic bacterial count (cfu/g) of examined red meat samples (n=30).

Samples	No. of examined samples	+ve samples		Min.	Max.	Mean ± SE
		No.	%			
Row red meat	30	30	100	2.5×10^4	1.8×10^7	$2.43 \times 10^6 \pm 6.95 \times 10^5$
Cooked red meat	30	30	100	10^3	10^7	$9.40 \times 10^5 \pm 5.32 \times 10_5$

Table (2): Statistical analytical results of *Staphylococcus aureus* count (cfu/g) of examined red meat samples (n=30)

Samples	No. of examined samples	+ve samples		Min.	Max.	Mean ± SE
		No.	%			
Row red meat	30	30	100	3×10^3	1.7×10^5	$4.80 \times 10^4 \pm 8.63 \times 10^3$
Cooked red meat	30	16	53.33	10^3	3.4×10^6	$2.45 \times 10^4 \pm 1.16 \times 10^4$

Table (3): Statistical analytical results of total coliforms count (MPN/g) of examined red meat samples (n=30).

Samples	No. of examined samples	+ve samples		Min.	Max.	Mean ± SE
		No.	%			
Row red meat	30	26	86.67	40	2×10^6	$2.55 \times 10^5 \pm 1.14 \times 10^5$
Cooked red meat	30	3	10.00	30	40×10^3	$28 \times 10^3 \pm 2.23 \times 10^3$

Table (4): Incidence of *Salmonella* in examined meat samples (n=30).

Samples	Suspected ±ve samples		Total isolate suspect to be salmonella	Presumptive salmonella isolates by biochemical test		Confirmed Salmonella strain by Serology
	No.	%		No.	%	
Raw red meat	9	30	24	3	12.5	-ve
Cooked red meat	5	16.7	12	1	8.33	-ve

From the results achieved in Table (1), it is evident that total aerobic bacterial count in all examined raw red meat and cooked red meat samples (100%) ranged from 2.5×10^4 to 1.8×10^7 with a mean value of $2.43 \times 10^6 \pm 6.95 \times 10^5$ and 10^3 to 10^7 with a mean value of $9.40 \times 10_5 \pm 4.32 \times 10^5$, respectively. The results clearly prove that correct heating can successfully reduce the total number of contaminating bacteria but can not completely eliminate it from food (3).

The obtained results also reveal that all examined red meat samples are within the allowable limits of $<5 \times 10^7$ for aerobic bacterial count (2). Similar results obtained by (8) where the total aerobic bacterial count of cooked meat samples was 1.14×10^5 cfu/g. Also, the obtained results similar to the results obtained by (4), which denote that the average Log_{10} aerobic bacterial count for cooked samples ranged from 3 cfu/g to 7 cfu/g.

Table (2) reveal that (100%) of examined raw red meat samples had *Staphylococcus aureus* count with counts ranged from 3×10^3 to 1.7×10^5 with a mean value of $4.8 \times 10^4 \pm 8.63 \times 10^3$ cfu/g while that of cooked red meat samples reveal that only (53.33%) had *Staphylococcus aureus* count

ranged from 10^3 to 3.4×10^6 with a mean value of $2.45 \times 10^4 \pm 1.16 \times 10^4$ cfu/g.

Lower percent may be attributed to the effect of cooking in destroying *Staphylococcus aureus* but relatively higher number may result from post cooking contamination (7).

The results presented in Table (3) reveal that (86.67%) of examined raw red meat samples contain coliforms count ranged from 40 to 2×10^6 with a mean value of $2.55 \times 10^5 \pm 1.14 \times 10^5$ cfu/g while that of cooked meat samples reveal that only 10% of samples contained coliforms count ranged from 30 to 40×10^3 with a mean value of $28 \times 10^3 \pm 2.23 \times 10^3$ cfu/g. Such results prove an efficient effect of cooking on reducing coliforms in meat (10).

Table (4) indicated that Salmonella couldn't be isolated from any of the examined samples.

The considerably higher level of contamination in our examined samples necessitate proper handling of raw materials during receiving, preparation and must be efficiently cooked, on the other hand, education programs should be given to processors to improve the quality of the finished meals and prevent post cooking contamination.

References

1. **American Public Health Association (APHA) (1992):** Compendium of methods for the microbiological examination of foods. 3rd Ed. Washington, DC, USA.
2. **Canadian Government Provisional Guidline, "Wehr" H.M. (1982):** Attitudes and polices of governmental agencies as microbial criteria for foods. An Update. Food Technol., 36(9): 45-54.
3. **FAO/WHO (1990):** Gastrointestinal infections in England and Northern Ireland (1980-1989). New Letter No. 1, WHO, Surveillance Programmer for control of food infection and intoxication in Europe.
4. **Food microbiology (1997):** Vol. 14, Issue 3, Pages, 273-282.
5. **International Commission of microbiological specification for foods (ICMSF) (1978):** Microorganisms in foods, their significance and methods of enumeration. 2nd Ed. Univ. of Toronto Press, Toronto and Buffalo, Canada.
6. **Jay, M.J. (1978):** Modern Food Microbiology. 2nd Ed. D. Ranostrand Company, New York.
7. **Jill Trickett (1955):** Food hygiene for Food Handlers. 2nd Edition, MacMillan Press LTD.
8. **Pak, J. (2008):** Microbial quality of cooked meat foods in Tehran University's Restaurants. J. Med. Sci. July September, Vol. 24, No. 4, 595-599.
9. **Smith, B.A. and Baired Parker, A.C. (1964):** Method for *Staphylococcus aureus*. J. Applied Bact., 27(1): 78-82.
10. **Undo, E.E.; Al-Busan, M.A.; Jacob, L.E. and Chugh, T.D. (1999):** Enterotoxin production by coagulase negative potential cause of food poisoning. J. Med. Microbial. Sept., 48(9): 819-823.
11. **Varnam, A.H. and Evans, M.G. (1991):** Food borne pathogens. An Illustrated text. Ltd. Brook house 2-16, Torrington Palace, London, England.

لحالة البكتيرية لوجبات مدن كفرالشيخ الجامعية

نادر يحيى مصطفى و غادة عبدالعاطى كامل
كلية الطب البيطرى - جامعة كفرالشيخ - قسم مراقبة الأغذية

الملخص العربى

تم جمع (٦٠) عينة من اللحوم الحمراء قبل عملية الطهى وبعدها (٣٠ من كل نوع) من مطاعم المدن الجامعية بكفرالشيخ. وقد جمعت العينات عشوائيا على مدار سنة دراسية كاملة ونقلت إلى المعمل مباشرة حيث تم فحصها لمتوسط العدد الكلى للميكروبات الهوائية ومتوسط العد الكلى لميكروب العنقود الذهبى ومتوسط العد الكلى للميكروب القولونى وكذلك مدى تواجد ميكروب السالمونيلا في عينات اللحوم الحمراء قبل عملية الطهى فكانت النتائج كالتالى:
٢,٤٣ × ١٠^٦ ± ٦,٩٥ × ١٠^٥/جرام ، ٤,٨ × ١٠^٤ ± ٨,٦٣ × ١٠^٣/جرام ، ٢,٥٥ × ١٠^٥ ± ١,١٤ × ١٠^٥/جرام ، صفر. أما النتائج لنفس الميكروبات بعد الطهى فكانت ٩,٤٠ × ١٠^٥ ± ٤,٣٢ × ١٠^٥ ، ٢,٤٥ × ١٠^٤ ± ١,١٦ × ١٠^٤ ، ٢٨ × ١٠^٣ ± ٢,٢٣ × ١٠^٣ ، صفر/جرام على الترتيب.
حيث تبين من الدراسة عدم وجود ميكروب السالمونيلا فى أى من عينات اللحوم الحمراء. وقد دلت النتائج على أن تواجد ميكروب العنقود الذهبى والميكروب القولونى فى اللحوم الحمراء بعد عملية الطهى يشير إلى تلوث العينات من الأدوات وأيدى القائمين على العمل من خلال تحضير الطعام أو تقديمه للطلاب. وقد نوقشت النتائج ومقارنتها بنتائج الباحثين السابقين وكذلك مناقشة الأهمية الصحية لهذه الميكروبات والشروط الصحية الواجب توافرها والأخذ بها للحفاظ على صحة المستهلك وسلامة هذه الوجبات.